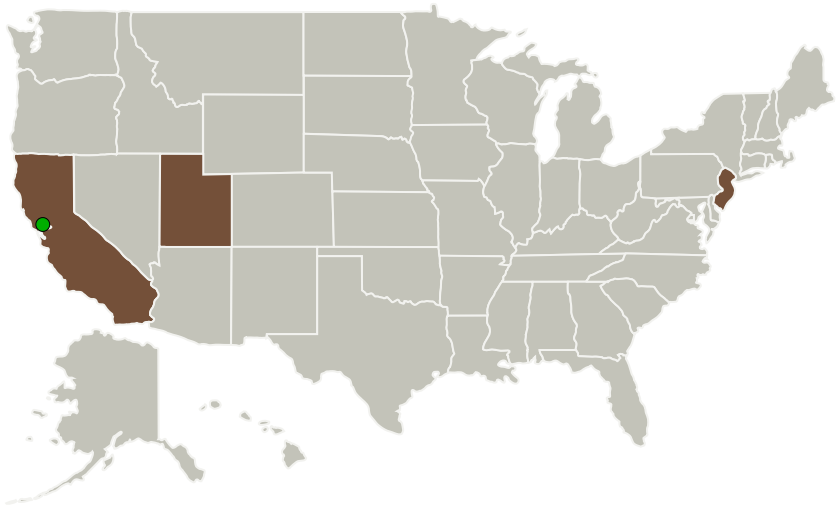
Conjugate Etalon Spectral Imager (CESI) & Scanning Etalon Methane Mapper (SEMM), Phase II

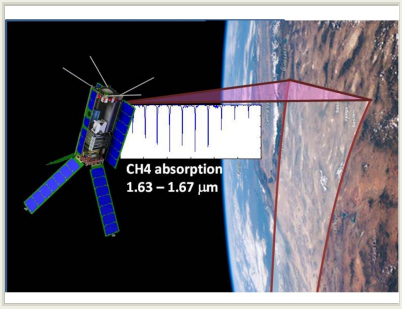
Completed Technology Project (2014 - 2017)

Project Introduction

Development of the CESI focal plane and optics technology will lead to miniaturized hyperspectral and SWIR-band spectral imaging instrumentation compatible with CubeSat and other nanosat platforms. The project will implement the technology by developing a CubeSat-compatible SEMM instrument for global mapping of atmospheric methane concentrations. Specific Phase I technical objectives include: - Perform a trade study comparing the performance potential of alternate concepts for a miniaturized spectrometer with respect to the methane mapping mission. - Demonstrate that the image of a scene collected through an interferometer is a product of the scene radiance pattern with the interferogram. - Build a laboratory prototype and demonstrate enhanced detection of a multi-line molecular absorption band. - Test novel detector devises suitable for high-gain, low-noise SWIR imaging in a nanosat setting. - Develop the instrument architecture for SEMM and validate the concept analytically by a radiometric model. - Design the high sensitivity, low-noise SWIR focal plane for SEMM. The CESI project is undertaken by Wavefront LLC with the Space Dynamics Lab (SDL) collaborating as the research institution. The key personnel are the Project Manager and the Principle Investigator (from Wavefront) and the scientists (from SDL). The duration of Phase I is 12 months. During Phase II, SDL will prototype the complete CESI instrument incorporating Wavefront's novel high-sensitivity focal plane and readout over 24-month duration.

Primary U.S. Work Locations and Key Partners





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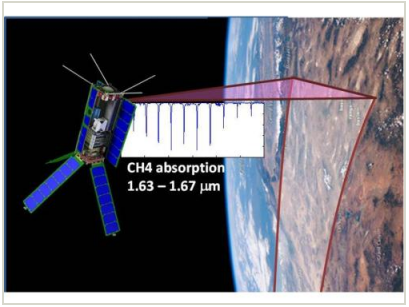
Organizations Performing Work	Role	Type	Location
Wavefront LLC	Lead Organization	Industry Minority-Owned Business	
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Utah State University - Space Dynamics Laboratory(SDL)	Supporting Organization	Academia	North Logan, Utah

Primary U.S. Work Locations	
California	New Jersey
Utah	

Images



Briefing Chart Image
Conjugate Etalon Spectral Imager (CESI) & Scanning Etalon Methane Mapper (SEMM), Phase II
(https://techport.nasa.gov/image/133891)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Wavefront LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jie Yao

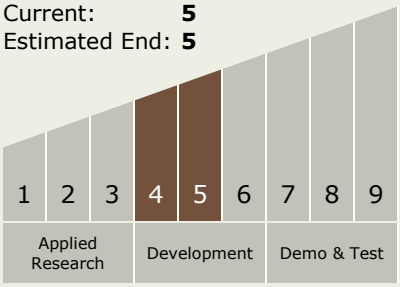
Co-Investigator:
Jie Yao

Conjugate Etalon Spectral Imager (CESI) & Scanning Etalon Methane Mapper (SEMM), Phase II

Completed Technology Project (2014 - 2017)

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System